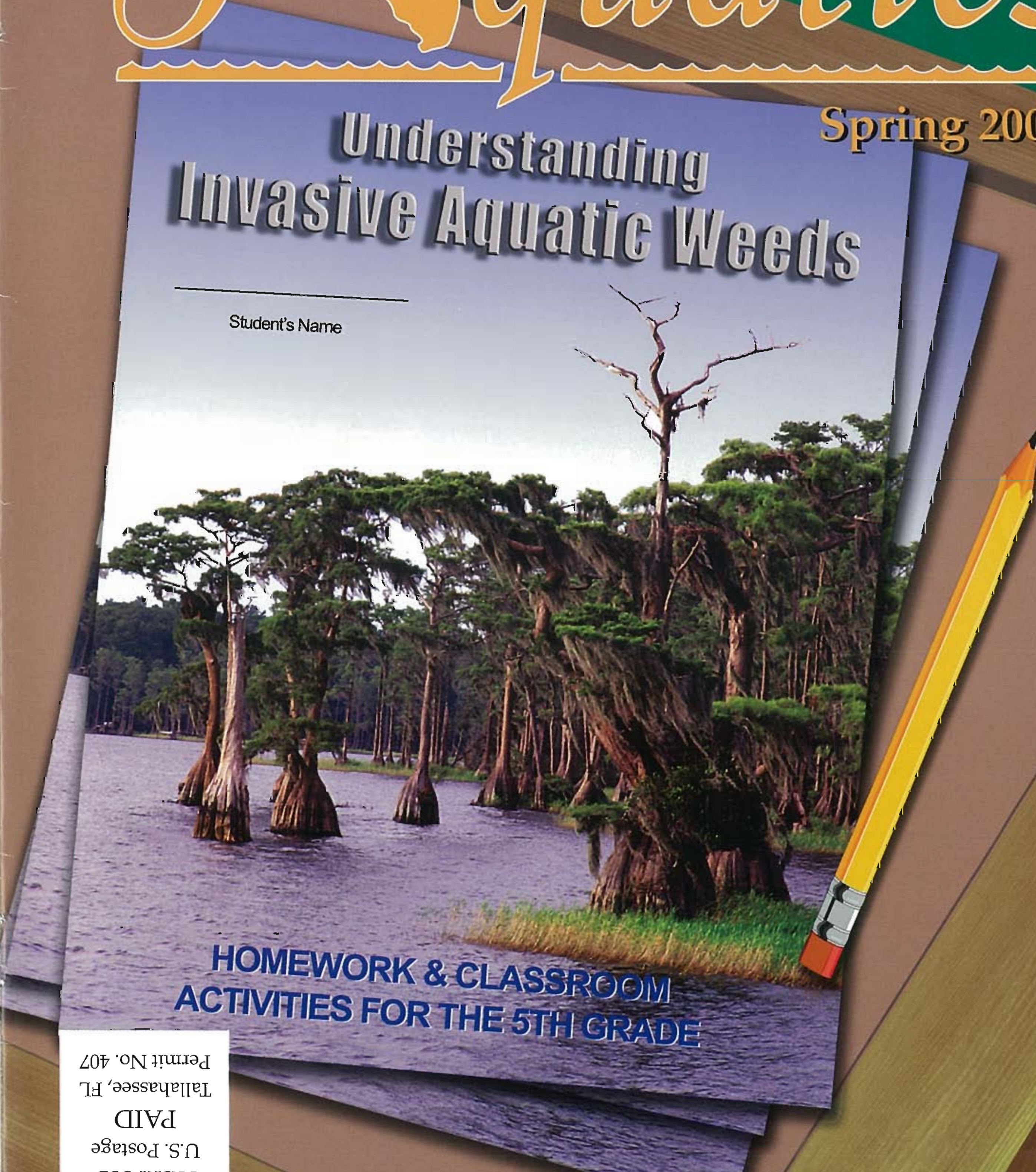
Aquatics

Spring 2002



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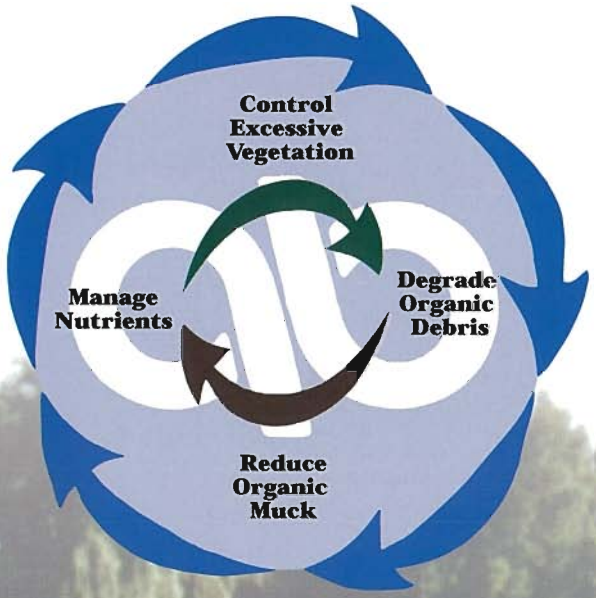

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Editorial

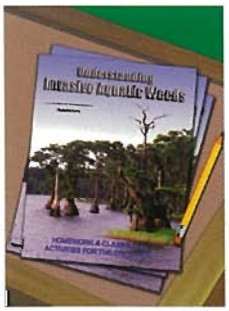
President Dwight Eisenhower warned in his farewell address of the rise of the Military-Industrial Complex. Today, Florida faces the *Environmental-Industrial* Complex. As with the Military-Industrial Complex, the new Complex's influence is best described by President Eisenhower's prophetic words. "The total influence - economic, political, even spiritual - is felt in every city, every state house and every office of the federal government." He further warned that the Military-Industrial Complex was affecting research and universities. "The Prospect of domination of the nation's scholars by federal employment, project allocation, and the power of money is ever present - and is gravely to be regarded." This warning applies in Florida because it is not just federal dollars, but state dollars that fuel the Environmental-Industrial Complex.

President Eisenhower provided a final warning. "Yet in holding scientific research and discovery in respect, as we should, we must be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite." These words apply directly to the issues at Lake Okeechobee as well as the restoration efforts at the Everglades and Lake Apopka. There is no doubt that there are many individuals, including many in the scientific community, who strongly believe that Lake Okeechobee is threatened by eutrophication. There, however, are alternative interpretations and it must be recognized that the philosophy of the scientists and management agencies influences interpretation of data. Alternative interpretations of the data may not be addressed adequately in any single report.

Alternative interpretations of the data also should not be discounted because they fail to agree with the current "conventional wisdom." However, the evidence at Lake Okeechobee indicates that additional expensive phosphorus control activities will do little to improve the lake's water quality in a reasonable time frame. It

Continued on page 18

FAPMS Website:
www.homestead.com/fapms/main.html



This is the cover of the "Understanding Invasive Aquatic Weeds" booklet whch shows a view of Santa Fe Lake, Florida from Jimmy Pennington's Boat Dock. See page 4 for more information.

Photo by Jeff Schardt.

Aquatics

Spring 2002/Vol. 24, No. 1

Contents

AQUATICS (ISSN 1054-1799): Published quarterly as the official publication of the Florida Aquatic Plant Management Society Registration No. 1,579,647. This publication is intended to keep all interested parties informed on matters as they relate to aquatic plant management particularly in Florida. To become a member of FAPMS and receive the Society newsletter and Aquatics magazine, send $20.00 plus your mailing address to the Treasurer.
EDITORIAL: Address all correspondence regarding editorial matter to Judy Ludlow Aquatics Magazine.
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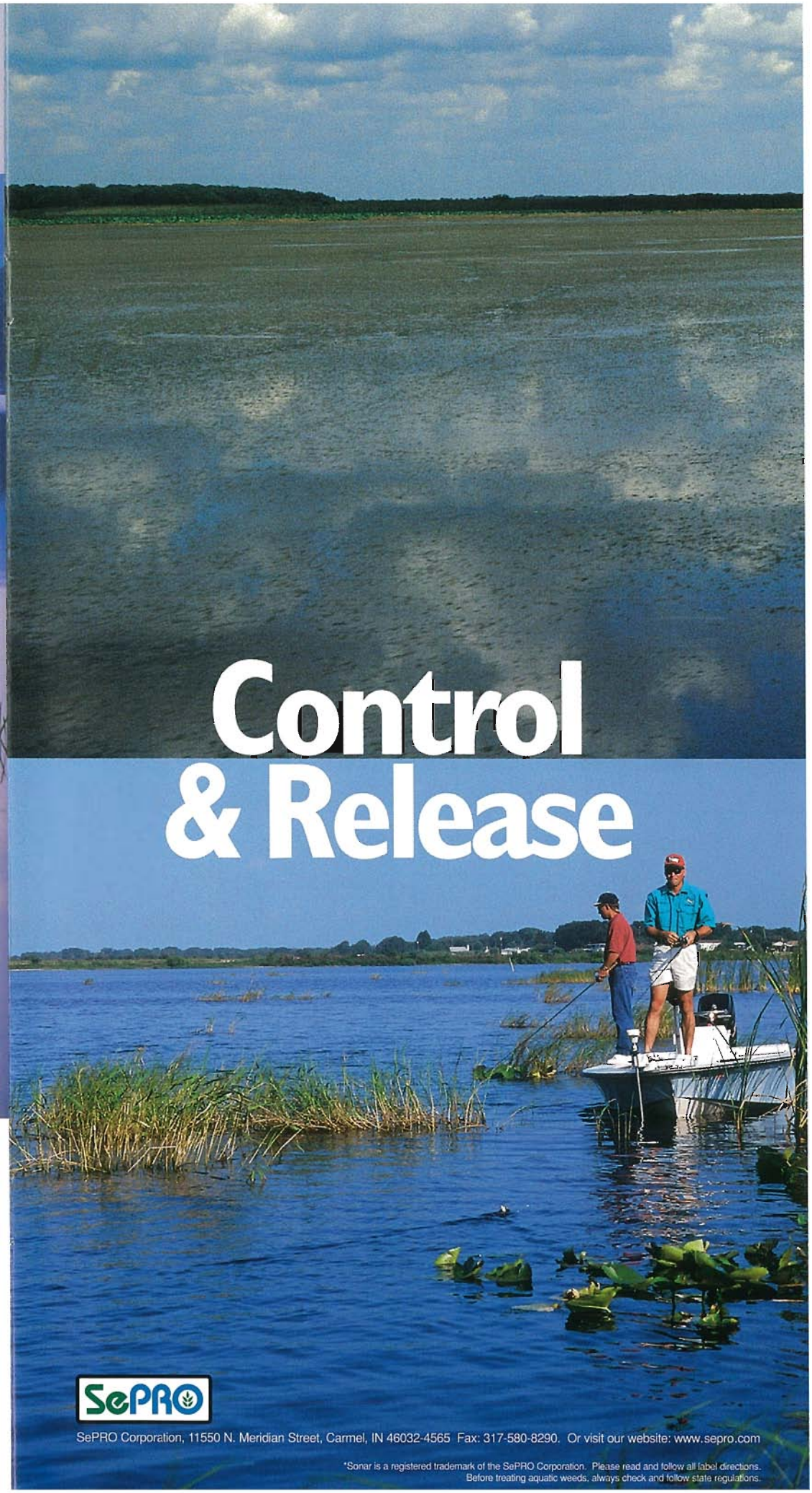
The Invasive Aquatic Plant Education Booklet Becomes a Reality

By Jeff Schardt

On February 7, 2002, the first of 400,000 copies of the Aquatic Plant Management Society's 5th grade education booklet on invasive aquatic plants were forwarded from the printer to distribution centers. The APMS elementary education project began modestly four years ago with the acquisition and distribution of 7,000 invasive plant packets from the Intermountain Ag Foundation. These packets contained color photos, text, and student activities on 10 upland and aquatic invasive species from across the country. While the message was important and the format effective, the APMS wanted an educational instrument that focuses exclusively on the problems caused by, and management solutions available for, invasive aquatic plants.

During 2000, the APMS Education and Outreach Committee drafted an eight-page, two-sided loose-leaf packet with information and classroom activities relating to five aquatic plants that cause or pose national or broad regional problems in the US. These plants are hydrilla, water hyacinth, Eurasian watermilfoil, purple loosestrife, and giant salvinia. Teachers and student reviewers agreed that the subject material was too complex for the originally intended 3rd grade audience, suggesting that the 5th grade might be more appropriate. They also recommended more color, highlighted text boxes, and binding the pages into a booklet to present the message in a format more familiar to today's students. All of these changes were made within the original $73,000 per year budget while allowing production



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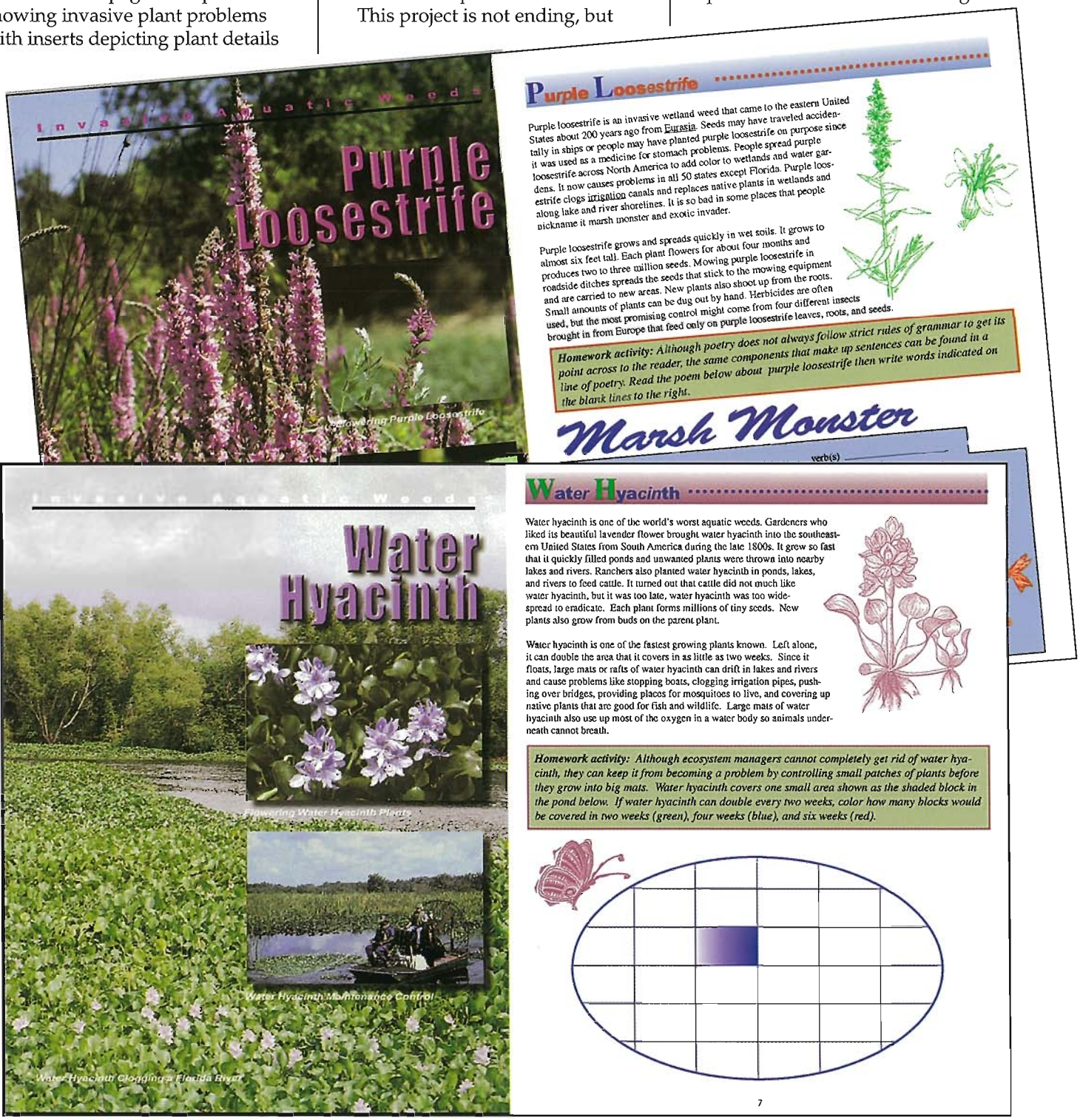
to **increase** from a projected 250,000 copies to 400,000!

The final 5th grade invasive aquatic plant booklet is far different from bureaucratic-looking drafts you may have seen during 2001. The opening messages on invasive plant origins, problems that they cause, and management strategies are still there. The full-page color photos showing invasive plant problems with inserts depicting plant details and management operations still accompany text specific to each plant along with homework activities. The difference is the enthusiastic critiques from teachers and students, and the generous contributions from sponsors have culminated in a high-quality educational product that will reach hundreds of thousands of children and their parents.

This project is not ending, but rather is just beginning with the printing. APMS has partnered with the National Sea Grant Foundation to distribute more than 300,000 of the booklets across the country to teachers interested and trained in environmental sciences. In this way, we are assured the product will be put to good use. Nearly 55,000 copies will be distributed among



APMS (20,000) and the regional chapters (4,800 each). The University of Florida will attach a booklet (a total of 10,000) to each invasive and native aquatic plant poster, sent free to teachers, to stimulate additional interest. Finally, the US Fish and Wildlife Service will distribute 25,000 copies at their hands-on exhibits at wildlife refuges, and has expressed an interest in donating $15,000 for an additional 60,000 copies next year.

The APMS elementary education project is funded for two years. The first year's effort will be revised upon receiving comments and the second edition will be reprinted in late 2002. APMS leadership will need to assess the booklet's effectiveness via input from teachers and from the regional chapters. Comments will be compiled on the APMS web site. Your ideas will help to improve next year's edition and determine the future of the elementary education booklet.

Photo by Jeff Schardt

Will Stringent Phosphorus Control Improve the Quality of Lake Okeechobee?

Dr. Daniel E. Canfield, Jr.

Nutrient enrichment (eutrophication) has been recognized as a major environmental problem for 50+ years because of an association with fish kills and aquatic weed problems. A 310-km^2 algal bloom occurred in the western quarter of Lake Okeechobee in August 1986[1]. This algal bloom raised fears that one of the nation's richest and most famous sportfisheries was about to collapse. Political forces made a decision that nutrient control was needed to reverse the perceived adverse effects of eutrophication.

The Lake Okeechobee Technical Advisory Committee (LOTAC) recommended in the mid-1980s that total phosphorus (TP) inputs to the lake should be reduced by at least 40% to protect long-term water quality[2]. Scientific evidence indicated that nutrient control would not improve overall lake quality[3]. Regardless, a costly nutrient control program was implemented. The clean-up program has now cost hundreds of millions of dollars and drove out of business over 20 dairies.

Record high open-water TP concentrations (120 µg/L) were measured in 1996 and 1998. This alarmed environmental groups and led to the belief that the situation at Lake Okeechobee was an emergency. South Florida Water Management District (SFWMD) stated millions of new dollars for reservoirs, marshes, and dredging projects north of the lake were needed. The debate, however, soon became more than just a political and scientific debate in 1998. A U.S. Court issued a Consent Decree that

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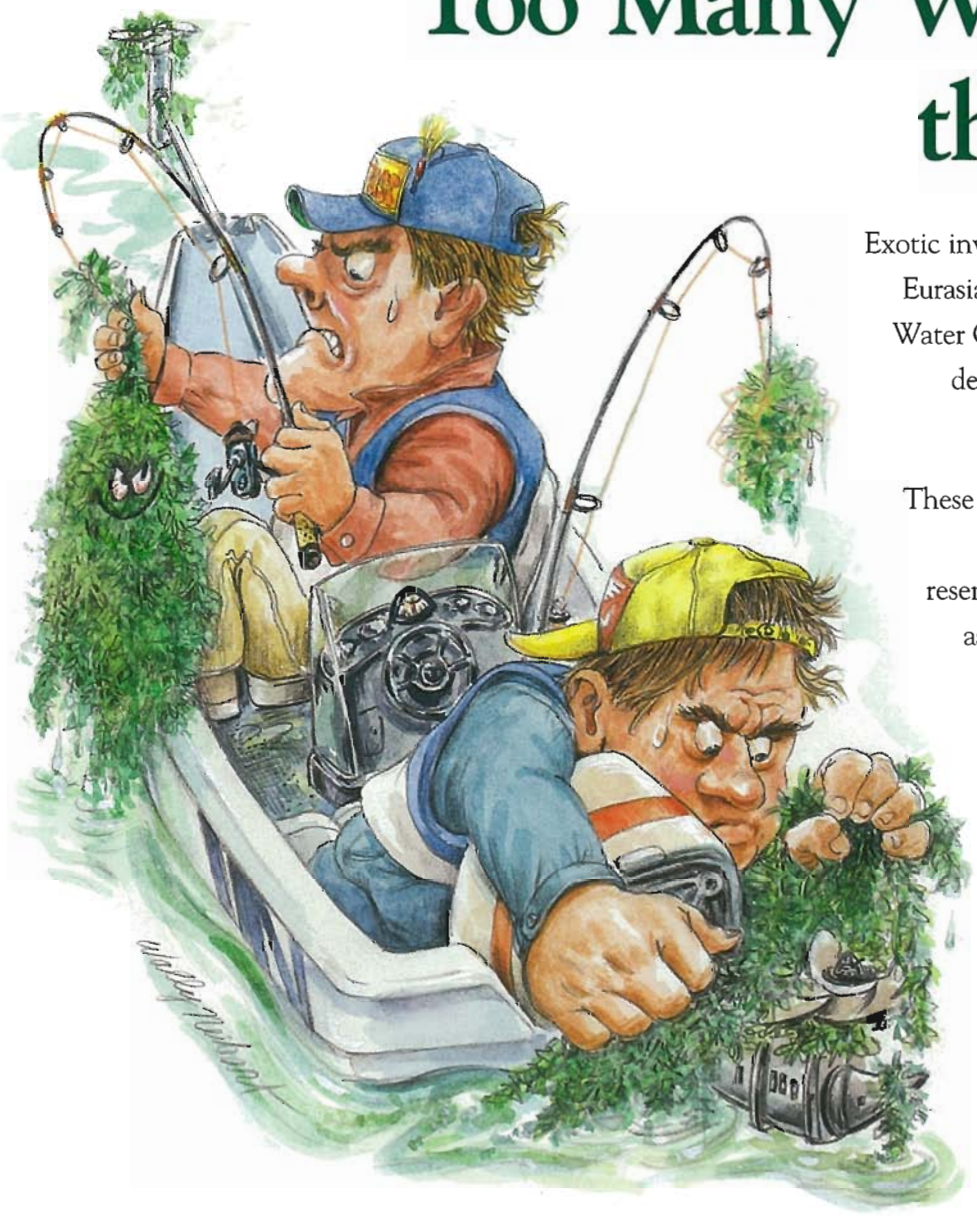
Dr. Daniel E. Canfield, Jr. is a Professor of Limnology in the Department of Fisheries and Aquatic Sciences at the University of Florida. He also served as President of the North American Lake Management Society (NALMS); an international society dedicated to the management of lakes. ***For more* Aquatics *articles on Lake Okeechobee please refer to 1987, Volume 9, June and September.***

Too Many Weeds Spoil the Fishing.



Exotic invasive aquatic plants such as Hydrilla, Eurasian Watermilfoil, Curlyleaf Pondweed, Water Chestnut and Water Hyacinth can be detrimental to a healthy fishery in lakes across the country.

These invasive plants when left unmanaged can alter the ecosystem of lakes and reservoirs, causing a decline in the fishery, as well as interfering with other valued uses of waterbodies.

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required the U.S. Environmental Protection Agency (USEPA) and State of Florida to establish a Total Maximum Daily Load (TMDL) for TP at Lake Okeechobee (Florida Wildlife Federation et al. v Carol Browner et al., Case No. 98-356-CIV-Stafford). USEPA proposed a TP goal of 40 µg/L and a TMDL of 198 metric tons of TP per year in January 2000[4].

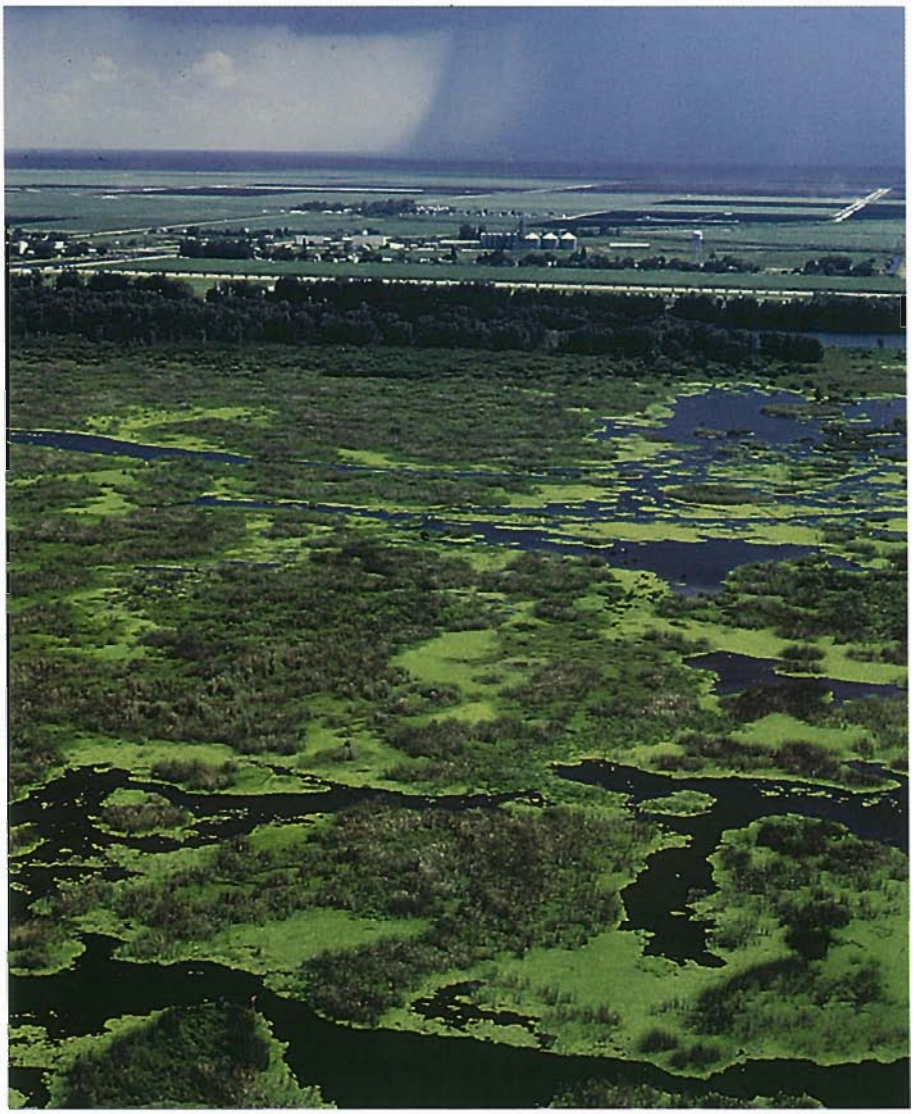
In this article, I review the eutrophication issue at Lake Okeechobee using SFWMD's 26-year water quality database. My conclusion, contrary to "conventional wisdom", is that Lake Okeechobee is not threatened by excessive TP inputs. Proposed TMDLs are unrealistic and will needlessly increase land-use regulations, adversely affect local tax-bases, and misdirect scarce public resources. More importantly, issues such as aquatic plant management are likely to be given less attention than they deserve as SFWMD focuses on phosphorus control.

Open-water TP Concentrations versus External Inputs

Open-water TP values at Lake Okeechobee were about 50 µg/L prior to the mid-1970s, but increased to over 90 µg/L in the 1990s (Figure 1a). Agriculture activities, especially dairy operations, were blamed, but no relationship has been established between TP values and nutrient inputs for the 26 years (Figure 1a, b)!

Measured external phosphorus inputs have averaged slightly over 460 metric tons between 1973 and 1998. Phosphorus inputs dropped from 812 metric tons in 1982 to 253 metric tons in 1993, suggesting to many individuals that nutrient control was working. But, phosphorus inputs have been above 400 metric tons since 1993. SFWMD's data indicates that high phosphorus concentrations are associated with elevated water level, suggesting that flooding previously dry lake bottom could be part of the reason for increased nutrient and algal levels[3].

In the 1980s, scientists suggested that nutrient recycling from the



Lake Okeechobee. Photo by Jeff Schardt

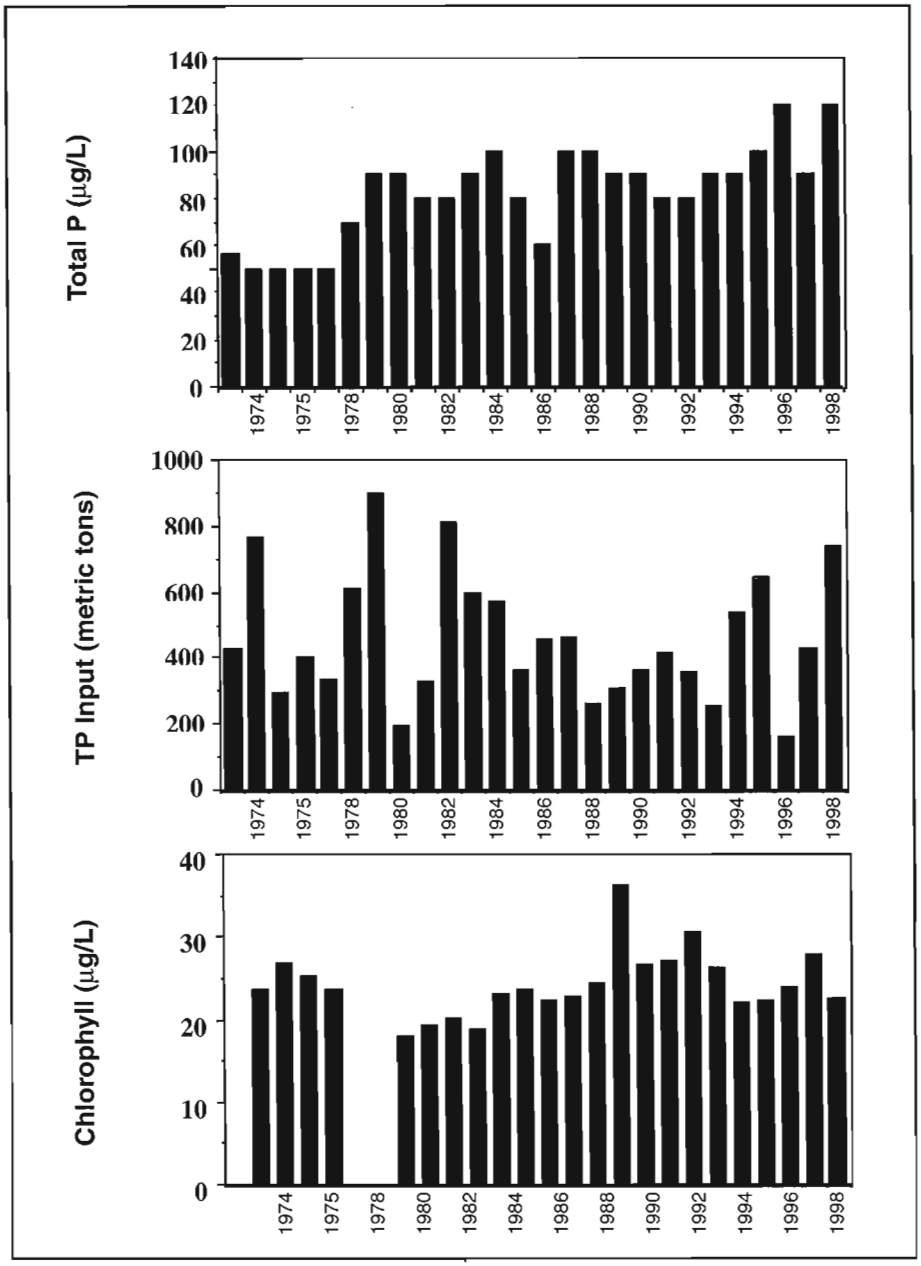


Figure 1. Annual (a) total phosphorus concentrations, (b) phosphorus inputs and (c) chlorophyll concentrations in Lake Okeechobee.

bottom sediments via wind resuspension was probably the dominant source of phosphorus for Lake Okeechobee. SFWMD's scientists subsequently demonstrated that wind activity affected TP concentrations as well as other lake chemical conditions. While inputs of phosphorus from the watershed are often substantial, scientists now recognize internal recycling of phosphorus is the dominant factor dictating open-water TP concentrations. Furthermore, any nutrient recovery resulting from proposed nutrient-control programs will not be observed for several decades or centuries[4]!

Open-water Algal Biomass versus TP Concentrations

When TP concentrations increase in a lake, concern focuses on what will happen to long-term algal levels (chlorophyll). Phosphorus is often the primary limiting nutrient for algae, but not necessarily the limiting environmental factor. The upsurge in TP between 1973 and 1998 has not, as predicted, corresponded to an increase in open-water chlorophyll concentrations at Lake Okeechobee (Figure 1c).

Open-water chlorophyll concentrations have remained relatively constant, averaging only 24 µg/L between 1973 and 1998. Lack of a response is not unexpected, as nutrients are not the primary limiting environmental factor. Suspended sediments, resulting from the resuspension of bottom sediments, cause low light availability. Without light, algae can not grow.

There is also a positive relationship between water levels and algal abundance in the near-shore/open-water interface region. Transport of phosphorus-laden water from open-water to the southern and western near-shore zones is a dominant factor affecting near-shore algae. So, while there may be a relationship between nutrients and near-shore algae, serious concerns regarding what effect nutrient reduction, if achieved, will have on the lake's algal abundance, arise.

Chlorophyll concentrations in open-water should average between 12 and 18 µg/L if nutrient concentrations (TP = 40 µg/L and TN = 900 µg/L) proposed by LOTAC are reached[3]. Large seasonal and spatial variations in algae (chlorophyll less than 10 µg/L to more than 100 µg/L) occur at Lake Okeechobee. An expensive monitoring program would be needed to detect the predicted reduction. This of course assumes that phosphorus would become the limiting environmental factor.

Annual open-water chlorophyll estimates have averaged between 18 and 36 µg/L from1973 to 1998. This type of change is well within the expected year-to-year variation for Florida and North America lakes. If light was not a limiting environmental factor and phosphorus was the sole limiting nutrient, scientific models indicate that chlorophyll

concentrations will still exceed SFWMD's definition of an algal bloom (chlorophyll concentration greater than 40 µg/L) in both the open-water and near-shore zones after any nutrient reduction program!

Water Clarity versus External TP Inputs

The public does not judge lake quality by phosphorus or chlorophyll concentrations. Clear water is assumed to be good and greenish or turbid water is bad. Water clarity has averaged less than 0.8 m in the open-water between 1973 and 1998. Low water clarity has been observed since the 19th century.[5,6] In 1887, it was written that winds tossed the water into "majestic billows, which rake up the bottom and bring to the surface a considerable infusion of sand, rendering the surface murky. The water itself, when not disturbed, is fairly clear and practically agreeable although held in bad repute by the few who have visited its shores." Water clarity is not related to algal levels and no impact can be expected from nutrient control. More importantly, the public will never see any difference in water clarity!

Fish Populations versus External TP Inputs

Perhaps the foremost concern with nutrient enrichment is damage to the sportfish population. Eutrophication has impacted some fish in northern lakes by causing a loss of oxygen in shallow ice-covered lakes or deep lakes with temperature stratification. Lake Okeechobee is a shallow subtropical lake. It never has ice cover and wind mixing prevents thermal stratification. The lake also supports warmwater fish (for example, largemouth bass and black crappie), not coldwater fish (for example, trout and salmon) typical of many northern lakes.

Demise of Lake Okeechobee's recreational fisheries has been predicted unsuccessfully since the mid-1970s. Fisheries studies of Florida lakes have shown that chlorophyll of

Lake Okeechobee Marsh. Photo by Jeff Schardt

240 µg/L has no significant impact on sportfish[7]. Lake Okeechobee has long-term chlorophyll less than 25 µg/L and never averages above 40 µg/L on any given year. Florida lakes also do not experience a decrease in fish species with nutrient enrichment. Consequently, government agencies, including the Florida Fish and Wildlife Commission, fertilize lakes to increase sportfish. Lake Okeechobee's sport fishery is, therefore, not in danger of imminent collapse from nutrient enrichment!

The 40 µg/L TP Goal

Since the 1980s, the appropriateness of selecting an open-water TP goal of 40 µg/L has been questioned. Reaching 40 µg/L might be feasible, but there is a scientific uncertainty. A TP of 20 µg/L was originally defined as the boundary between mesotrophic and eutrophic lakes in the 1970s. Florida researchers thought Florida lakes produced less chlorophyll per unit phosphorus than northern lakes so they modified the boundary value to 40 µg/L. They also called the phosphorus-loading boundary derived from the 40 µg/L target the "maximum allowable or critical" loading rate.

Most evidence indicates Lake Okeechobee was not mesotrophic, but eutrophic. If a lake is eutrophic, then having a phosphorus concentration above 20 µg/L and a phosphorus loading rate above the critical loading rate is to be expected. Changing to 40 µg/L should have been rejected immediately based on widespread experience, but now we know that there is no basis for assuming Florida lakes develop less chlorophyll per unit of phosphorus than northern lakes. Selection of the 40 µg/L TP goal is arbitrary!

There are few historical open-water phosphorus data. Some near-shore measurements made in the 1950s have been relied upon to suggest TP concentrations are now 2- to 3 fold higher and that it might be possible to reach a TP of 30 µg/L. Scientists have admitted that there are interpretation problems. But, when the open-water cannot be sampled, measurements from the lake's outlet are often sought as a surrogate measurement. The St. Lucie Canal, a major Okeechobee outlet, was also sampled in the 1950s and a TP of 97 µg/L was obtained. Measurements made by SFWMD since 1973 indicates that outlet measurements are related to current open-water phosphorus measure-

ments. Lake Okeechobee's open-water TP concentration was, therefore, probably substantially higher than 40 µg/L prior to 1973.

Modeling of SFWMD's 26 years of data predicts an open-water TP of 52 µg/L, excluding atmospheric deposition. USEPA estimates an atmospheric deposition of 71 metric tons, which could potentially increase in-lake TP concentrations an additional 12 to 22 µg/L. If atmospheric deposition is constant and only lake volume changes, only once does a predicted concentration approach 40 µg/L, which is the low water in-flow year of 1996. The target phosphorus goal should be at least 52 µg/L, not 40 µg/L. Considering atmospheric deposition, it should be greater than 60 µg/L. Selection of these values leads to the conclusion that the annual phosphorus input has to be higher than the critical loading rate recommended by LOTAC, not lower.

The Total Maximum Daily Load Approach (TMDL)

Annual TP inputs to Lake Okeechobee averaged 519 metric tons between 1973 and 1984. After 1990 when many nutrient control programs were implemented or close to implementation, TP inputs averaged 442 metric tons. Only 5 years out of 26 years had inputs equal to or below LOTAC's recommendation of 311 metric tons.

USEPA, in compliance with the judicial Consent Decree, established a proposed TMDL of 198 metric tons for phosphorus. USEPA used SFWMD's Lake Okeechobee Water Quality Model and the target phosphorus of 40 µg/L in establishing the TMDL. USEPA concluded the maximum assimilative capacity of the lake was 285 metric tons of TP, but predicted it would take between 1000 and 1500 years to achieve the in-lake TP goal of 40 µg/L.

USEPA concluded that a restoration time period greater than 1000 years was not reasonable, but considered 198 metric tons as an achievable phosphorus load. Selection of the 198 metric ton value indicated the lake might be restored in 200 to 220 years! Phosphorus inputs to the lake have been below 285 metric tons only 4 years between 1973 and 1998. Inputs have been below 198 metric tons only three times, with the lowest inputs occurring during low water-input years. Highest inputs occur during high water-input years, raising considerable doubt whether the proposed TMDLs can be achieved because of the direct relationship between phosphorus and water inputs[3]. Based on water input alone, annual TP inputs should average about 450 metric tons, not 198 metric tons.

Conclusion

USEPA's proposed TMDL for Lake Okeechobee is totally inappropriate. Given that USEPA is pro-

posing a 200+ year restoration and inputs sought by LOTAC constitute a restoration of 1000+ years, nutrient control should not be the highest priority. Continued emphasis on phosphorus control will result in the expenditure of massive amounts of public funds with little to show for the "pollution" control efforts because there is no relationship between the lake's open-water TP concentrations and external phosphorus inputs.

Internal processes of nutrient recycling will control in-lake nutrient concentrations for decades. There is no relationship between algae and TP in Lake Okeechobee. Nutrient control also will have no positive effect on water clarity or Lake Okeechobee's recreational fisheries. So, will stringent phosphorus control improve the overall quality of Lake Okeechobee? The answer must be an emphatic No!

If we assume the measured water in-flows to Lake Okeechobee between 1973 and 1998 reflect natural climatic variation, phosphorus inputs should average 450 metric tons. Even if a conservative approach is taken, phosphorus loads should be no less than 400 metric tons. If an in-lake phosphorus concentration of 50 µg/L is more realistic than 40 µg/L, estimates for watershed loading approach 442 metric tons. Increasing the in-lake target goal to 60 or 70 µg/L predicts inputs of 530 and 619 metric tons respectively. These are values close to those measured since the dairy buy-out program. Given USEPA's estimate of a 200+ year restoration time, it is time to take a less stringent and more realistic position on phosphorus control.

The greatest factor influencing Lake Okeechobee's recreational fisheries is water-level fluctuation. Maintaining high water levels causes loss of aquatic plants due to light limitation and wind action. Low water levels stimulate the growth of submersed plants. Aquatic plants are important fish habitat in this large lake. Managing water-level fluctuation for aquatic plants rather than nutrient control will have the best chance of benefiting the lake's sportfish. This management option is relatively inexpensive compared to nutrient control and is something that can be implemented relatively easily and quickly. However, fluctuating water levels will stimulate plants like hydrilla and water hyacinth. So the political and citizen support that the Lake Okeechobee Aquatic Plant Management Interagency Committee has attained needs to continue to be strengthened so that the 1980's debacle over water hyacinth control (stopping all herbicide usage) does not repeat itself.

Decisions regarding management actions are not just of scientific interest. Actions affect not only the lake, but people too! Human activity in the Lake Okeechobee watershed has

changed attributes of the lake. There are towns, cities and important agricultural enterprises. The lake has water outlets that didn't exist prior to humans. There is a massive dike, the Hoover Dike, around most of lake and water levels have been manipulated for flood control and water supply. There is also an extensive marsh that has developed at the lake since the construction of the Hoover Dike. And certainly, human activity has increased the input of phosphorus to the lake. However, the assumption that cultural eutrophication has adversely affected the lake over the last 60 years must be questioned!

Endnotes

[1]Jones, B. L. 1987. Lake Okeechobee eutrophication research and management. Aquatics 9: 21-26.

[2]Lake Okeechobee Technical Advisory Committee. 1986. Final Report Lake Okeechobee Technical Committee. Florida Department of Environmental Regulation. Tallahassee, Florida.

[3]Canfield, D. E. Jr., and M. V. Hoyer.1988.The eutrophication of Lake Okeechobee. Lake and Reservoir Management 4(2): 91-99.

[4]United States Environmental Protection Agency. 2000. Overview of total maximum daily load (TMDL) for TP for Lake Okeechobee. United States Environmental Protection Agency Region 4 (EPA-R4). Atlanta, Georgia.

[5]Thompson, M. 1878. The Witchery of Archery. C. Scribner's Sons, New York.

[6]Heilprin A. 1887. Explorations on the West Coast of Florida and in the Okeechobee Wilderness. Wagner Free Inst. Sci., Philadelphia.

[7]Bachmann, R. W., B. L. Jones, D. D. Fox, M. Hoyer, L. A. Bull, and D. E. Canfield Jr. 1996. Relations between trophic state indicators and fish in Florida (U.S.A.) lakes. Canadian Journal of Fisheries and Aquatic Sciences 53(4): 842-855.

Like a nasty flu virus can put you out of commission, invasive plants such as hydrilla, Eurasian watermilfoil and egeria can invade a waterbody and upset its natural balance, all but eliminating activities like fishing, swimming and boating.

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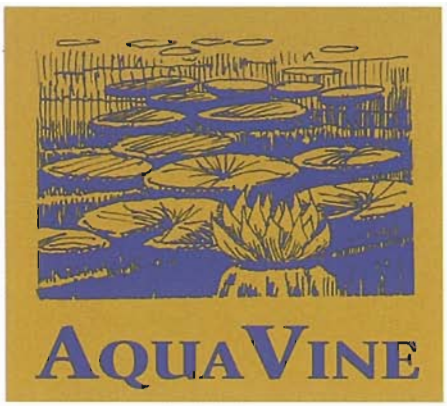

FAPMS Board Meeting— all are invited!

April 16, 2002, at 10:00 AM, Todd Olson 800-327-8745

Hydrilla Extends its U.S. Range

Mr. Rob Gatewood, conservation agent for the Town of Barnstable, Massachusetts provided the following information:

Hydrilla has recently been identified in Long Pond, a 49 acre kettle pond on Cape Cod, Massachusetts! Mr. Ron Sirch of the Association for the Preservation of Long Pond collected samples of this invasive plant, which were subsequently identified as hydrilla by botanist Barre Hellquist. Immediately after the positive identification, public boat access to Long Pond was closed until further notice.

Long Pond is located in Centerville, within the Town of Barnstable on Cape Cod. It has an average depth of 9 feet, so it is likely that hydrilla can effect most of this lake and become a source of infestation to surrounding lakes and ponds. The Town of Barnstable and the Association for the Preservation of Long Pond are working together to provide funding to develop and implement a hydrilla management plan. For more information on this and other nonindigenous aquatic species infestations including a current US range map please visit http://nas.er.usgs.gov/plants, and click on "Hydrilla new to Massachusetts."

Fire ants On the Move!

Red imported fire ants (RIFA) are widely established in the southeastern USA, with smaller populations in New Mexico, Arizona, and Nevada; now they are expanding their range in California. They have been found in southern California and the San Joaquin Valley. Just recently, however, they have been found as far north as Sacramento County. Read about it in this press release: www.cdfa.ca.gov/phpps/pdep/rifa/Sactoants.pdf

Parkway Research Acquired by Brandt Consolidated

Pleasant Plains, Illinois — January 17, 2002 — Brandt Consolidated, Inc. a leading manufacturer of liquid fertilizer and micronutrient products, announced today that it has acquired the operations of Parkway Research of Houston, Texas, a manufacturer of turf and horticultural maintenance chemicals and fertilizers. The acquisition of Parkway underscores Brandt's

commitment to its expanding leadership role in the "green industry," and follows the acquisition of Agra Chem of Avon Park, Florida last summer. Contact Ray Kimmel at 800.252.2905 for more information.

New Sonar Precision Release Herbicide

SePRO Aquatics announced their New Sonar* Precision Release* formulation at the October 2001 FAPMS meeting in Daytona Beach, Florida. The new, U.S. EPA registered Sonar formulation provides a faster, more predictable release of fluridone in a pellet formulation. Contact Mark Mongin at SePRO (1-800-419-7779) for more information.

Aquatic Weed Control Short Course 2002

May 19-24, 2002 Fort Lauderdale Marriot North, This short course will feature aquatic weed control, upland and invasive weed control, aquatic plant cutlture and revegetation, and a training session on the new natural areas weed management pesticide applicator category. For more information visit www.conference.ifas.ufl.edu/aw or call Dr. Vernon Vandiver at 954-577-6316.

Editorial

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is now prudent to take the time needed to further evaluate what has been done so far in the name of nutrient control and focus all available resources on the "holistic" management of Lake Okeechobee.

This does not mean that all research should be ceased or that all the nutrient management efforts be eliminated. The State of Florida, however, should focus on other activities such as aquatic plant management and water level management to maintain Lake Okeechobee's recreational fisheries. The debates regarding the potential effects of nutrient enrichment epitomize current "School of Thoughts" in the aquatic sciences. There must be a new and open discussion of all the issues at Lake Okeechobee in order that we not become victim to the pitfalls President Eisenhower warned us of. The Environmental-Industrial Complex must not hold the people of Florida and their elected-leaders hostage!

Dr. Dan Canfield, University of Florida

Aquatic Plant Scholarship Grant!

The South Carolina Aquatic Plant Management Society, Inc. is seeking applications for its annual scholarship grant. The Society intends to award a $2,000 grant to the successful applicant in the Fall of 2002.

Eligible applicants must be enrolled as full time undergraduate or graduate students in an accredited college or university in the United Sates. Course work or research in an area related to the biology, ecology or management of aquatic plants in the Southeast is also required.

Applications must be received no later than May 1, 2002, and are available in the internet at http://water.dnr.state.sc.us/water/envaff/aquatic/scapms.html. Other factors being equal, preference will be given to applicants enrolled in Southeastern and South Carolina academic institutions. The successful applicant may be requested to present an oral report at the annual meeting of the Society.

For additional information, contact

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2221 Devine Street, Suite 222
Columbia, SC 29205
803-734-9099, or e-mail,
johnsond@water.dnr.state.sc.us

John Rodgers found this striking creature stranded about 600 feet offshore on Ed Medard Reservoir, Hillsborough County. It is an Eyed Click Beetle (*Alaus oculatus*). The larvae of this beetle are predatory on the larvae of wood boring beetles and are usually found in rotting tree stumps. While not an aquatic insect, this beetle was likely flying, fell into the water, and then climbed out onto the safety of the cattails. Dr. William Kern, University of Florida, provided information on this critter.

Photo by John Rogers

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